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# INTERNATIONAL RIVER BASIN CO-OPERATION: THE LESSONS FROM EXPERIENCE

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## PREFACE

The increasing importance being attached to international water resources development and management has prompted the preparation of this report, "International River Basin Co-operation: the Lessions from experience", as a supporting document for the United Nations Water Conference.

The report is based primarily upon case studies covering the experience with management and development of nine selected river basins throughout the world and one experience with regional co-operation. The case studies and the respective investigators who conducted the research are listed in the annex. Professor I. K. Fox, Director of the Westwater Research Centre, University of British Columbia, Canada, was responsible for the general co-ordination of the research effort and assisted in the preparation of the final condensed report.

# INTRODUCTION

1. The world faces a critical shortage of water of suitable quantity and quality.

> "... globally there may be potentially enough water to meet forthcoming needs. But, frustratingly, it tends to be available in the wrong places, at the wrong time, or with the wrong quality. And in one way or another, all societies are affected, however rich, however poor" (E/CONF.70/CBP/1).

Political boundaries dividing a river basin or an aquifer aggravate the problem.

2. Water flows according to physical laws, irrespective of political boundaries. However, its use is governed by institutions and patterns of use responsive to political, social and economic demands. Where national boundaries divide a river basin, which is the physical unit for assessing and allocating water resources for various purposes, the co-riparians or co-basin countries must engage in a co-operative endeavour to rationalize use of the resource in terms of its capacity to meet the full range of the demands that exist.

3. The use of water by citizens of one country that shares a water resource may determine the benefits that the citizens of a co-riparian country can get from the same resource. Furthermore, use by one nation without regard for the potentials and demands in co-riparian nations can easily lead to inefficient use of available water supplies and inequitable sharing of the resources of a river basin. Such action can, in turn, result in ill feeling and political controversy of possible serious consequences.

4. International rivers, lakes and aquifers form a major part of the global stock of fresh water. There are over 200 continental river basins 1/ and many more tributary basins and aquifers that are divided by international boundaries. In view of the critical importance of using water resources efficiently to meet present and prospective demands for water in agriculture, industry and domestic use for the increasing world population, it is incumbent upon the nations of the world to find ways and means of achieving the best use of international water resources.

5. Improved management of international rivers, lakes and aquifers is not easy to accomplish. Some countries may have an economic incentive to ignore demands for basin-wide accords. Distrust and suspicion between States can reinforce one country's incentive to act alone or undermine endeavours that would be mutually

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1/ A continental river basin is one which is in direct communication with the final recipient of the water, i.e., ocean, closed internal sea or lake. The United Nations Department of Economic and Social Affairs has prepared a register of continental international river basins (E/C.7/21), currently under revision, which lists 214 such basins.

advantageous. Finally, some basin countries may not have the institutional and financial capability or the political interest to take advantage of opportunities for co-operative endeavours. These obstacles are difficult to overcome but progress can be made if there is, at least, the political will to co-operate.

6. Fortunately, in a number of regions of the world, nations have succeeded in working out fruitful arrangements for managing and using international water resources. Some of these experiences have been summarized and assessed in 10 case studies prepared for the United Nations Secretariat which provide a basis for arriving at some conclusions about how to foster constructive action, to manage and utilize international water resources efficiently and fairly. This statement is based on those reports. First, it seeks to define the nature of the problems that must be dealt with in the management of international water resources. Secondly, by drawing upon the experiences reported in the papers listed in the annex, it seeks to illustrate how co-operative action has been achieved and the kinds of institutions that have facilitated co-operative action; a concluding section summarizes the kinds of measures and institutional arrangements that experience suggests will foster the best use of international water resources.

## I. THE PROBLEM: FACTORS INFLUENCING THE CAPABILITY TO UNDERTAKE CO-OPERATIVE ACTION

7. The factors that influence the capability of co-riparian nations to engage in co-operative action to manage an international water resource may be classified into six categories, as follows:

(a) The differences and similarities in the evaluative frameworks of co-riparian nations;

(b) The uncertainties that exist with regard to the possible future effects of any joint arrangement;

(c) The physical-economic characteristics of the water resource management system as related to international boundaries;

(d) The international relations environment;

(e) Domestic factors within the co-riparian nations;

(f) The number of nations involved in the negotiation.

Each of these merits brief elaboration.

### The evaluative frameworks of the co-riparian nations

8. It is a premise of this statement and it is generally accepted that important objectives in the management of an international water resource are to maximize net benefits from the resource and to achieve an equitable sharing of the benefits

realized. It is widely recognized that in the consideration of benefits and costs are included much more than measurable economic effects. Benefits might include, for example, beneficial social and ecological effects, and costs might include uncertainties with regard to the likely consequences of a given course of action. In some cases, the political effects of water development may be regarded as a benefit or a cost. Each nation seeks to take into account all the benefits and all the costs associated with the development of an international water resource, but experience has demonstrated that it is extremely difficult to reach agreement among co-riparians on how to weigh such benefits and costs. Since nations have differing priorities which come, in part, from differing political, social and economic conditions in each country and, in part, from differing cultural heritages, it is generally not practicable to arrive at an objective statement of benefits and costs that is both comprehensive and acceptable to the co-riparian nations. As indicated in the case studies which follow, practical means of surmounting this obstacle have been found in a number of situations.

### Uncertainties with regard to possible future effects

9. It is, of course, difficult to foresee the long-term consequences of an international agreement in the management and use of international water resources. Since certain types of water development actions, such as the building of a dam, are virtually irreversible and since an international agreement limits the ability of any one nation to change the course of action agreed upon, the uncertain consequences of an agreement constitute an important obstacle to joint action, an obstacle that cannot be completely overcome by investigation and analysis.

### The physical-economic characteristics of the water resource management system

10. The potential uses for which a river can be managed and the location of developmental and use activities in relation to the location of political boundaries influence in a significant way what the incidence of benefits and costs will tend to be, and determine the kinds of arrangements that will be necessary to achieve what will be mutually regarded as an acceptable sharing of such benefits and costs. Some patterns that result from the physical-economic characteristics of a water resources system are more amenable to co-operative action than others. These various patterns may be classified into three types which pose differing kinds of incentives and disincentives for nations to co-operate.

#### Potential benefits to one riparian State undiminished by the same type of use by co-riparians

11. This type of situation applies primarily to navigation uses, although in theory it could apply to others. If an international river has potential for navigation use, each co-riparian can engage in such use without impairing the

benefits from similar use by other co-riparians. In such cases, the international agreement need involve no more than a guarantee of freedom of navigation such as has been in operation in the Rhine since the Treaty of Vienna in 1815. If improvements are necessary to facilitate navigation, agreement will be necessary on the sharing of the costs of such developments. Since in this type of situation each riparian country can benefit from an agreement at little cost to itself or little damage to the resource, navigation agreements tend to be the easiest to negotiate and therefore, historically, they have been the earliest form of international water resource co-operation.

Each riparian State has equal access to use of the resource but use by one diminishes potential benefits available to co-riparians

12. Water resources within a region are normally of a fixed stock. Thus, where countries share a water resource which forms an international boundary between them, i.e., a contiguous river, lake or aquifer, use of the resource either for abstraction or waste disposal will decrease the potential benefits for similar use by the neighbouring States. Extreme competition over a fixed common resource leads to the "tragedy of the commons". In this case, the benefits from use of the resource are captured by the country using it while the costs in terms of degradation and depletion of the resource are shared with the neighbouring countries. This can lead to a competitive situation in which each country seeks to capture as much of the benefit from the resource as possible before it is no longer usable. Fortunately, in the case of inland water resources the number of States along an adjacent water resource is usually small enough so that the cost of the destruction of the resource, although shared, is sufficiently high for each to have an incentive to seek a common solution for its management; hence, benefits from use of the resource can continue. As indicated in the case studies below, this type of problem is being dealt with effectively in numerous regions of the world, the Great Lakes region between the United States of America and Canada being a prominent example.

Potentials exist for increasing benefits to all co-riparians through integrated development of a river basin

13. There are opportunities for increasing the total net benefits from the water resources of a region beyond the benefits which can be realized through independent action by each co-riparian, by undertaking a co-ordinated programme of development for the entire international river basin. For example, regulation of the Senegal River will provide flood control and hydropower production and permit development of navigation works in the three participating basin countries - Mali, Mauritania and Senegal. In this case, it is necessary to conceive of a programme which will maximize net benefits without regard to international boundaries and then seek agreement on a sharing of the benefits and costs that all co-riparians will regard as equitable. While the potential increase in benefits derived from integrated development results in a powerful incentive to reach agreement on an integrated programme of development, differences in evaluative frameworks (referred to above) and different views on how the costs and benefits

should be divided pose difficult problems to be overcome, which have resulted in many years of negotiation before agreement would be reached in a number of regions. For example, planning and negotiation for integrated flood control and hydropower production in the Columbia River between Canada and the United States took 20 years.

14. This type of problem is generally found in river basins where countries lie in an upstream/downstream relationship to one another, i.e., in successive international rivers. Two situations can be identified in this case:

(a) An upstream country may abstract water or impair water quality and thus reduce the benefit available to downstream countries while the downstream countries are unable to impose similar costs upon the upstream country. Thus, the upstream country has no economic incentive to reach an agreement, and reliance must be placed upon other types of incentives if mutually acceptable joint actions are to be achieved;

(b) A downstream country located at the mouth of a river flowing to the ocean might, without constraint, not only withdraw water from the river but also pollute it. Thus, this downstream country may enjoy a competitive economic advantage over upstream countries which may have to abide by pollution control regulations or agreements among riparian countries.

15. Both the above situations exist, for example, on the Rhine River where, fortunately, a number of incentives have been found to foster co-operation among the co-basin countries.

## The international relations environment

16. Considerations entirely divorced from the economic incentives for use of an international river affect the willingness of basin States to work together. The foreign policy orientation of a country, the history of relations among riparian countries, differing interpretations of and commitments to international legal principles, nationalism and sovereignty considerations are some of the types of issues that can either make for an atmosphere conducive to co-operation or may, at the extreme, poison it. Where the foreign policy stance is positive towards neighbouring countries, even the disincentives for co-operation in an upstream/downstream situation can be overcome. This was the case, for instance, of the Colorado salinity issue in which the United States agreed to reduce the salt concentration of the water it passes on to Mexico, and the earlier 1944 Colorado River Treaty apportioning the river's waters between the United States and Mexico. On the other hand, where there is ample economic incentive, management and development opportunities can be undermined by incompatible foreign policy objectives or a long history of suspicion and mistrust.

## Domestic factors

17. Factors internal to each of the riparian nations as well as the international relations environment influence the prospects for joint action to manage a water

resources system. These include the nature of the governmental system, institutional mechanisms for national policy formulation, the strength and role of interest groups, the nations' priorities for resource development, and the technical and financial resources available for co-operation in water resource development.

18. These factors warrant little elaboration in this statement. It is evident that where authority is divided between national and regional governments, as in the federal systems of Canada and the Federal Republic of Germany, an extra dimension is added to the negotiating process. Some countries have more highly developed policy mechanisms than others. Interest groups are very active in national policy formulation in some countries and, thus, play a major part in establishing national policy with regard to a possible agreement on the management of an international river. The reaching of an agreement may be of high priority in one country and of relatively low priority in another. While such factors may have an important bearing upon the capability of the riparian nations to reach agreement, little can be done to deal with any obstacles they create except upon the initiative of the individual country. On the other hand, if the technical and financial resources available to one or more of the countries limits effective co-operation, the international community can be of assistance. In section II below there are notable cases where such assistance has been provided.

### The number of nations involved in the negotiation

19. The problem of achieving agreement in joint action increases with the number of nations involved. It is self-evident that it is generally much easier to reconcile differences between two countries than among three, and as the number increases, the problem of achieving agreement becomes progressively more difficult.

## II. LESSONS FROM EXPERIENCE: WAYS OF FOSTERING CO-OPERATIVE ACTION

20. As the foregoing presentation suggests, the problem of achieving co-operative action will vary greatly from situation to situation. If the nations involved have a common cultural heritage and a history of good working relationships with one another, the task of achieving agreement is much simpler than it is if these conditions do not exist. The strong foreign policy differences between countries in the Senegal basin which might have threatened integrated development of the basin was, in part, eased by bonds in terms of a common working language, similar judicial arrangements and similar bodies of law and government organization. In the Volta basin, a long history of bilateral and multilateral relations between Ghana and its riparian neighbours made natural early discussion of joint development opportunities. Certainly, in the case of the Columbia River Treaty between the United States and Canada the common cultural background and language and a long history of friendly relations between the two countries facilitated the negotiation of an agreement. The physical-economic characteristics of the water resources management system as related to international boundaries can make

the task a particularly easy one. For example, if a waterway can be used by one State without depriving another State of potential benefits, little difficulty in reaching a navigation agreement should be encountered.

21. Our concern, of course, should be with the more difficult situations where agreement does not come easily. In these cases, we must seek to understand the kinds of steps that can be taken to facilitate joint action and that will foster best use of water resources and equitable sharing of the benefits. At the same time, it must be recognized that a number of factors that tend to slow up the agreement process, such as the domestic factors described, are not susceptible of modification or change, except in a context that extends well beyond the management of international rivers. Needless to say, in the more difficult international water resources situations there is no substitute for a conscientious endeavour - a will to co-operate - on the part of each nation involved. Beyond this critical element, experience indicates that there are a number of concrete things that can be done.

22. In considering the kinds of things that can be done, it is essential to keep in mind that each riparian State must determine what pattern of development and use most nearly accords with its concept of what constitutes efficient use of the resource, and a fair division of the benefits and costs. Efforts to facilitate agreement must aim primarily at providing a deeper understanding of what the realistic options are and what the effects of each option, if implemented, are likely to be.

23. There follows a listing of the kinds of things that might be done, as suggested by experience in the river basin situations listed in the annex.

Careful attention should be given to generating information about the effects upon each riparian country involved of alternative schemes of development and use

24. The World Bank recognizes from its experience assisting in international river projects that, in addition to goodwill, the commitment of basin countries to reach agreement, and their willingness to share technical and economic information is an essential condition for success. A sufficient array of technical, economic, legal and other pertinent data is required so that each Government and any external financing or other agency involved can be satisfied that the solution proposed is equitable and feasible. This will require as a necessary condition full information on the net benefits to each country from each alternative.

25. In case after case, agreement could only be achieved after the basin countries were equipped with sufficient information and capable of assessing by themselves the consequences of alternative courses of action, to permit national leaders to negotiate with confidence that the proposed endeavours are really the best available to a country and could be equitably sustained over time. For the Indus Treaty, the massive array of information collected and the preparation of engineering studies of numerous alternative development plans permitted each

Government to evaluate the relative equity of any proposal. In the same way, the accumulation of information from a number of planning and project studies proving the value of integrated development of the Senegal River provided a basis for successful negotiation for joint development.

26. The planning arrangements for the Pilcomayo River in the Río Plata basin deserve a brief review since they are indicative of the careful preliminary thought that should be given to the type of information to produce and the manner in which the information should be used. In this case, the investigations were designed to fill in gaps in basic data and knowledge needed for further planning, provide recommendations flexible enough to adjust to the anticipated long-term period for implementation, and tailor, as closely as possible, the information produced to the needs of the basin countries.

27. A two-phase study has been initiated. The first phase seeks to remedy deficiencies in basic data and information regarding the area's natural resources, social, productive and infrastructural conditions. The study will go on to establish development possibilities including the financial implications and feasibility for the basin countries. Information from this phase will provide the basis for political decisions on the priorities for development in the various sectors and the degree of development intended to be achieved in the basin. The second phase will follow up the first by investigation of specific components of the first study and selection of an alternative plan that is compatible with the regional and national objectives.

28. An important feature of the investigations is the composition and role of the co-ordinating committee which is composed of representatives from the basin countries and the three aid organizations - the United Nations Development Programme (UNDP), the Organization of American States (OAS) and the International Development Bank (IDB). It will direct studies so that the proper information is produced and then utilized by the basin country's political leaders. Through periodic revision of the investigation, it can inject the concerns, objectives and recent thinking of the leaders in the basin countries to ensure that once the studies are complete the findings will be relevant to them. It is hoped these pre-feasibility studies will produce the information that indicates the advantages of going on to the next phase which will require detailed feasibility studies, procuring investment funds, and the design of international and national organizational structures for the implementation and management of the recommended projects.

29. Information generation can be costly. The Vardar-Axios investigations have cost about $5 million. However, since well-founded information is the key to ensuring that co-operative arrangements are relevant to national needs, investment in this sector is a critical initial condition to foster co-operation.

## Possibilities entirely within each country for providing the services from water resources that might be secured through international action should be fully explored

30. Togo and Benin, before commiting themselves to the purchase of much needed

power from the Akosombo Dam in Ghana on the Volta River, explored the prospects of developing their own hydropower resources in the Mono basin. The results from these United Nations-assisted studies were encouraging. The studies showed that a firm basis for co-operation could be worked out. The Mono project would take 10 years to construct and in the interim period it would be profitable for the two countries to arrange for the purchase of Ghana's Volta power. On the Black Volta River between Ghana and the Upper Volta both countries recognized joint development opportunities for power development, but both sides are proceeding with feasibility studies of sites located entirely with their own countries (the Noumbiel site in the Upper Volta, the Bui site in Ghana). As well, Ghana is investigating a site along a common reach of the river. The studies, conducted separately although co-ordinated, will provide information on domestic alternatives to meet current needs which should make clear whether there is a present or future area of mutual interest which each side can satisfy through joint development.

31. The recognition of the relative merits of domestic alternatives to international ones is an important first step in assessing each country's interest in joint development of a shared river. Domestic projects, if they can accomplish many of the same objectives as international ones, are likely to have more appeal, for they receive nationalist support, add to national prestige, have greater national and regional impact since the benefits of the project are not shared, and they avoid entangling international arrangements that may restrict a country's flexibility in making policy. Only when each country is satisfied that the international alternative is the best option open to it is there a firm basis for co-operation.

32. The Senegal River is a case in which there is not only a common interest among the three lower riparian countries but, in addition, the interest is complementary. Development of the river, principally through a major dam at Manantali in Mali to regularize the downstream flow, will help to ease common constraints such as poor transportation infrastructure, vulnerability to drought and high energy costs, as well as meet the pressing needs in each country - agricultural and livestock development in Mauritania which is totally dependent on the Senegal River, diversification of the ground-nut crop in Senegal upon which that country solely relies, and access to the sea and the reduction of the high cost of energy for Mali. The recognition of this mutual dependence has been perhaps the major reason for the progress now being made in the development of the Manantali Dam and other works in the basin.

> If a nation is limited in its ability to undertake adequate technical, economic and social studies, international agencies and members of the international community should provide needed assistance and also aid in the training of professional personnel within the countries involved

33. In order to generate information about alternative schemes of development, in order to assess the advantages of co-operation and in order to proceed with

the construction of projects, expertise is required in a number of subjects. If, for lack of experience and trained personnel, this expertise is not available for one or more of the co-basin countries, outside assistance must be sought. Actually, assistance may be valuable even if basin countries already have a relatively high degree of professional competence in the water resource field, such as Greece and Yugoslavia had in the Vardar-Axios basin project. In this case, systems analysis techniques developed elsewhere were brought in to strengthen the capability of each country to assess the integrated development potential of the basin.

34. If such involvement by outside experts and the adaptation of foreign technology and know-how are carried out properly, it should have the additional benefit of training local personnel and lead to a higher level of national self-sufficiency in the field. In the Pilcomayo River development programme which has been assisted by OAS, UNDP and IDB, training of personnel from the three basin countries is a specific objective of the study.

35. In some situations, it might be appropriate to create regional training institutes on a permanent basis. These would certainly be concerned not only with international rivers but also with other relevant aspects of national river basin development. The advantage of such institutes derives from the need to pull together scarce resources and they should also help to build confidence and mutual respect among professionals of the co-basin countries.

A concerted effort should be made to secure basic agreement on the technical aspects of alternative management and use schemes

36. Negotiations on substantive normative issues will be needlessly complicated and prolonged if there are disagreements over basic technical issues. These technical matters can readily be resolved by working groups of experts from the basin countries or a more structured joint technical committee in charge of co-ordinating and integrating basic data-gathering and technical feasibility studies. Negotiations for the Columbia River Treaty between Canada and the United States was aided by agreement on the possible alternative schemes and on the supporting hydrologic and engineering data. In this case, each side acquired confidence that the information was correct and impartial because it was generated by a joint advisory engineering board under the respected and unbiased International Joint Commission (United States and Canada). Agreement on the technical basis for co-operation freed the negotiators to concentrate on the important issues of alternative selection and the division of benefits and costs for the selected projects.

Continuing communication and exchange of information at the technical as well as at the political level should be encouraged as a means of building mutual trust among the co-riparian nations

37. Continuing communication at the technical level has been an important factor in encouraging basin-wide co-operation. Co-operation is built upon trust and

understanding. This can be most readily achieved by building upon positive experiences. Technical exchanges in which there is a minimum of political judgement make for positive working relationships between personnel from the basin countries. Integration of an agreed-upon limited range of technical functions through both informal and formal international institutional arrangements can, in addition to providing mutually accepted information which is the basis for fruitful negotiation, develop the confidence and trust between basin country personnel needed for further joint undertakings.

38. For example, continuing contacts through technical sessions and discussions between technical personnel from the Volta River Authority in Ghana and the Communauté d'électricité du Bénin (Benin and Togo) have spread mutual trust, understanding and the desire to achieve acceptable solutions which have opened the way for closer future co-operation for the Volta system. For the Vardar-Axios River, regular biannual meetings of the Joint Yugoslav-Greek Commission for the Vardar-Axios and monthly meetings of its Co-ordinating Directorate provide a focus, sense of urgency and incentive for teamwork, as well as mutual understanding of the differing socio-economic approaches to technical reports, contractual procedures and criteria of judgement. Functional responsibility of the Directorate to authorize payment for local contracting works helps provide an ongoing aim and purpose to the international meetings. For the Commission, continuity of membership has enabled the commissioners to get to know one another and develop an atmosphere of greater mutual confidence which is expected to be helpful in reviewing the final reports and technical conclusions.

39. The effort to promote communication and understanding will require time, effort and funds. For example, the Vardar-Axios studies for integrated development were delayed because of the unanticipated time required to translate reports and documents from the local language to the common project language and vice versa. In spite of the delay, the translation of documents was essential to establish communication by ensuring full comprehension of the contents of all reports and documents by all concerned.

## Imaginative ways of sharing benefits and costs so as to provide the necessary incentives for agreement should be fully explored

40. The basic incentive for co-operation is that each nation must gain some net benefit. Sacrifices in achievement of a joint objective must be more than compensated for by an expected benefit. A wide range of incentives may be encountered. Most common are direct economic benefits from projects located on national territory, such as the substantial increase in the Nile flow obtained through projects to prevent loss of water in the swamps of the White Nile in the Sudan, which are equally financed by the Sudan and Egypt and which benefit not only Egypt but the Sudan as well; or the indirect cash compensation received by Canada as its reward for constructing storage dams on the Columbia River within its territory for hydropower production and flood control downstream in the United States; or the direct cash compensation received by Pakistan from India to compensate for loss of the water from the Indus tributaries that normally flowed to Pakistan.

41. However, in some cases, especially in sequential river situations where the upstream country can realize little advantage from co-operation, a more flexible approach to encourage joint actions may be appropriate. Benefits such as improved trade links may be used as an inducement by one country to get another to co-operate. Where upstream countries are degrading the river for use by the downstream countries, the downstream countries - contrary to prevailing opinion regarding the "polluter pays" principle - may have to pay for the cost of stopping the damaging activity. For example, recently the three Rhine countries - the Netherlands, Federal Republic of Germany, and Switzerland - agreed to help pay France part of the cost of storing the salt discharges from the potash mines in Alsace that France normally discharges into the river. The downstream country may also draw to the attention of the upstream country values it holds in terms of international law, neighbourly relations, or some other foreign policy consideration, such as those which influenced the United States to reduce the salt concentrations of the Colorado River water it passes on to Mexico. These examples indicate that a flexible approach should be taken to ensure that all the basin countries will have some incentive for agreement and there is a basis for agreement.

The international community should continue to build a consensus as to what constitutes an equitable division of the benefits and costs resulting from the development and use of international water resources

42. Resolutions 21 and 22 on States' responsibility and liability, adopted at the United Nations Conference on the Human Environment; the Helsinki Rules; the proposed European Convention of the Protection of International Watercourses against Pollution and the Principles on Trans-frontier Pollution of the Organisation for Economic Co-operation and Development (OECD) are all global and regional principles and rules of conduct which, if adhered to by basin States, can facilitate co-operation. They help reduce the issues to be settled in negotiation by pointing out the responsibilities expected of each country and setting out principles for the equitable division of the benefits and costs resulting from the development and use of international water resources. International river issues often entail conflict between public international morality, as expressed by international law, and basin State self-interest. There are few sanctions to apply against those countries which disregard internationally accepted rules of behaviour and accepted principles of sharing, except the disapproval of the international community. Thus, to counter the strong self-interest incentives open to a basin country in a favourable location within the basin, efforts should be made by the international community to elaborate appropriate principles of equitable use of international rivers, but the principles worked out must be the result of intensive consultation between Governments to ensure that they represent something close to a consensus. The international legal community has made much progress in building such consensus on the general principles of the equitable utilization of international rivers but much more work needs to be done to strengthen the consensus and expand the principles, thus making them more comprehensive in application to the many different types of international river situations.

If a nation does not have the financial resources to undertake its share of a potential joint development programme, international lending institutions and members of the international community can make important contributions in the provision of funds

43. In many basins, the opportunities for development cannot be realized unless the basin countries receive outside assistance. Multilateral and bilateral financial assistance between organizations in the donor countries and particular basin countries can help bolster the capability of a basin country to take advantage of its opportunities on a shared river. However, it is important that this type of bilateral and multilateral assistance be extended to all basin countries needing assistance and that this assistance be co-ordinated and complementary.

44. In 1956, Pakistan and India with assistance from the World Bank were discussing a sharing arrangement for the waters of the Indus system. The waters of the river and its tributaries would be divided and those that formerly flowed into Pakistan from India would be replaced, in part, by storage works on the western rivers in Pakistan through connecting canals. However, agreement was not reached at this point because, as the Bank admits, it was slow to appreciate that neither country could meet the cost of those works necessary to effect replacement. Solution to the controversy could not be reached until funds could be found to finance these works from sources outside the basin countries. The World Bank helped establish the Indus Basin Development Fund to which outside countries such as Australia, Canada, the Federal Republic of Germany, New Zealand, the United Kingdom and the United States contributed. The Indus case points out the importance of the planning and negotiation stage to account for the financial capability of the basin countries to undertake the works needed, to ensure an equitable agreement and the important role international lending institutions play in strengthening the financial capability of the basin countries. Where the financial capability is lacking, attention must be given to finding outside sources at the time a feasible alternative is decided.

45. An example of a successful bilateral aid approach was a simultaneous request by Ghana, Togo and Benin to the Canadian Government to finance first a study and finally the cost of transmission facilities linking the three West African countries, to permit the sale of the surplus power of the Akosombo Dam in Ghana to Togo and Benin. On the other hand, in another part of the Volta system a recent mission of the United Nations Conference on Trade and Development (UNCTAD) pointed out that bilateral assistance from France and Australia could have been better integrated. Funding by France of feasibility studies and site investigations of the Noumbiel site in the Upper Volta on the Black Volta River and the Australian aid for similar studies on the Bui site in the Ghanian reach of the river could have been more closely integrated by the creation of a control agency to co-ordinate the work of the consultants.

In order to minimize the potential for friction among nations involved over basin implementation arrangements, agreement should limit as much as is possible the dependence of one nation upon continuing actions by another to realize its share of the benefits

46. Countries are often reluctant to enter into joint arrangements if projects that will be vital to their economy and development are controlled by another basin country. There can be no guideline stipulating the degree of sovereignty control over projects, for the requirements for each situation are unique. However, to reduce the unease over potential loss of sovereignty entailed in international co-operative arrangements, strategic works should, as much as is practical, be designed and located in such a way that each State retains as much control as possible over works on which it is greatly dependent. One need only note that a key point to the solution of the Indus River controversy between Pakistan and India was to find a scheme in which Pakistan would have control over the works upon which it would be most dependent. Also, the awkward position Zambia faced by not having any sovereign control of the powerhouse for the Kariba Dam it shares with Southern Rhodesia on the Zambesi River when that country illegally declared independence is indicative of the situations countries fear might occur if they do not have the necessary control to assure protection in case of drastically altered political relations between countries.

International agreements should be as flexible as practicable in order to permit adjustments in water use and management in response to unforeseen changes in conditions

47. Inflexibility of an agreement will freeze the political motivations, technological possibilities and economic conditions at the time of signing. Some inflexibility is unavoidable; dams, once constructed, are a permanent commitment to one form of technology and have only limited possibilities for modification in response to new technologies. Nevertheless, given this limitation, flexible co-operation is possible. A treaty should constitute a framework which sets out the principles upon which joint development can proceed, with detailed planning and implementation of projects left to joint technical groups operating under political direction. This permits a response to changing economic and technological circumstances within the terms of the agreement, without the need for renegotiation of a major international undertaking. In the Columbia River development, there is strong evidence that if Canada and the United States had not tied themselves so firmly into one pattern of development in the Treaty in the period after the Treaty was signed and before the projects were implemented, they could have taken advantage of changing technical conditions and other circumstances and modified their original plans to produce greater benefits than those under the Treaty.

48. In addition to flexibility in project design and implementation, treaties and agreements between basin countries which call for development based on shared costs and benefits should be flexible enough to maintain an equitable division of